REMARKS/ARGUMENTS

Reconsideration of this application is requested. Claims 11-16 remain in the application under active examination subject to entry of this Amendment.

Claim 9 has been canceled without prejudice or disclaimer, while claim 11 is amended to include the preferred aspect of the disclosure as discussed in the comments that follow.

The Official Action contains two prior art-based rejections. The first, in item 3, is based upon a combination of Stiker in view of Oshitani and Treger et al; the second is based upon a different primary reference, Kobayashi in view of the same two secondary references. The amendments now made to claim 11 clearly distinguish the claim from the disclosures of the applied references as will be apparent from the comments that follow.

An objective of the process of the present invention, in addition to those having been discussed in the previous arguments of record, is to obtain a cadmium negative electrode for an alkali secondary cell that maintains metallic cadmium particles as the charge product to have a small diameter (i.e. a large specific surface area), by which the charge and discharge characteristics are improved (see paragraphs [0034] to [0037]).

In particular, the process of the invention, as reflected in the above amendments to claim 11, includes a step of applying a preliminary charge to the active substance packed electrode before incorporating it in the cell. This step is not taught by any of the cited references. Excellent characteristics can be obtained by the process as compared to the conventional technique because of at least the following factors:

In a sealed alkali secondary cell it is necessary, for preventing the inner pressure of the cell from being increased, that the capacity of the positive electrode active substance is restricted to a value smaller than the capacity of the negative electrode active substance to maintain the alkali secondary cell in a positive electrode restricted state. As one measure for satisfying the requirement, the active substance packed electrode is partially charged in an alkali aqueous solution to assure a prescribed extent of preliminary charge (reserved discharge) amount (see paragraph [0018]). By applying a preliminary charge amount to the active substance packed electrode by the aforementioned method (i.e. applying a small amount of charge to the active substance packed electrode), a small amount of metallic cadmium is formed in a finely dispersed state in the active substance packed electrode.

On charging the cell, on the other hand, cadmium hydroxide as the active substance is once dissolved in the alkali electrolytic solution and then deposited as metallic cadmium in the active substance packed electrode. An ordinary active substance packed electrode suffers no problem since formation of crystal nuclei of metallic cadmium is restricted. However, in the case where metallic cadmium is formed in advance in the active substance packed electrode by the partial charge as mentioned above, a previously unknown problem has been found – cadmium hydroxide dissolved in the alkali electrolytic solution is deposited with metallic cadmium as nuclei, by which crystals of metallic cadmium are grown to bring about significant deterioration in cycle characteristics. Accordingly, it will be understood that the present invention relates to a process for solving this problem peculiar to the case where an active substance packed electrode is partially charged to assure a prescribed amount of preliminary charge.

As a result of investigations on the problem by the inventors, it has been found that on charging the cell, cadmium hydroxide as the active substance is once dissolved in the alkali electrolytic solution and then deposited as metallic cadmium through cadmium complex ions.

As a result of further investigations, it has also been found that by chelating ether oxygen of polyethylene glycol to the cadmium complex ions, diffusion of cadmium complex ions is inhibited to maintain the particles of metallic cadmium deposited to have a small diameter.

The inventors have investigated a means for solving this problem, and have found that it is effective to charge the cell having incorporated in it an active substance packed electrode having a polyethylene glycol film formed thereon (see paragraph [0034], Table 1, and Figure 1).

Considering next the applied prior art documents, the cited references fail to show that a preliminary charge is applied to an active substance packed electrode before incorporation in a cell, and thus do not recognize the problem to be solved by the present invention.

The examiner commented on production efficiency as a reason for limitation in average molecular weight of polyethylene glycol to a range of 600 to 20,000. However, the actual reason why the average molecular weight is limited to this range is to inhibit diffusion of cadmium complex ions (see paragraph [0034]); the issue on production efficiency is merely a subsidiary matter (see paragraph [0038]). The range of average molecular weight in the present invention is for attaining simultaneously the inhibition of diffusion of cadmium complex ions and the

improvement in production efficiency. Applicants submit that the cited references fail to suggest such an optimization.

For the above reasons it is respectfully submitted that the claims of this application as above amended define inventive subject matter. Reconsideration and allowance are solicited.

Respectfully submitted,

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